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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,930	11/08/2001	Hany Aziz	D/A1251	7770

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EXAMINER	
GARRETT, DAWN L	

ART UNIT	PAPER NUMBER
1774	3

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/005,930	AZIZ ET AL.	
	Examiner	Art Unit	
	Dawn Garrett	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 32, 33, and 35 are objected to because of the following informalities: Claims 32, 33, and 35 use numbering such as (i)-(iii)..., which do not correspond to the layers numbered (i)-(vi) in claim 1, upon which these claims depend. For example, in claim 1, the region comprising an electron transporting region is (vi) while in dependent claim 32 the electron transporting region is (v). It is suggested for purposes of clarity that other consecutive numbering such as (a)-(e), etc. be used for the dependent claims or that the same numbering for each layer or claim 1 also be applied in the dependent claims.

2. Claims 33 and 35 are objected to because of the following informality:

It is suggest that "and" at the end of part (ii) be changed to "or". The examiner has interpreted the claim to require one of (i), (ii) or (iii).

3. Claims 32, 34, are objected to because of the following informalities:

Claims 32 parts (iv) and (v) and claim 34 parts (iii), (v), (vi) use improper Markush language. They recite, for example, "comprised of one of....A, B, **and** C". The language should be changed to one of the following:

1) "comprised of one of...A,B, **or** C" OR

2) "comprised of one from the group consisting of...A, B, and C".

Appropriate correction and/or clarification are required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-12, 15-18, 21-29, 31, 36-51, and 53 are rejected under 35 U.S.C. 102(e) as being anticipated by Aziz et al. (US 6,392,250). The applied reference has common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Aziz et al. ('250) discloses an organic light emitting device having improved performance comprising a mixture of a hole transport material, an electron transport material and at least one dopant material. The device also comprises at least one of a hole transport material region and an electron transport material region on the mixed region. Any of the electron transport layer, hole transport layer, and/or mixed region may comprise a plurality of layers or single layers per instant claims 12, 15, 16, 39, 40,

and 43 (see abstract). It is noted that the thermal protective layer is optional in instant claim 1. Per instant claim 1, part (v), and claim 42, Aziz '250 sets forth the same hole transport materials for forming the hole transport region and the mixed region (see col. 8, lines 19-32) and the same electron transport materials for forming the electron transport region and the mixed region (see col. 9, lines 37-53). Also, per instant claims 2-6, 41, 44, 47, 50, and 51, Aziz discloses the electron transporting material may be similar or dissimilar and the hole transport material may be similar or dissimilar (see col. 6, lines 36-64). Aziz et al. discloses all required components of independent instant claim 1 and 53. Per instant claim 7, preferred hole transport material includes tertiary aromatic amines (see col. 8, lines 33-35) and preferred electron transport material includes stilbenes and metal oxinoids (see col. 9, lines 37-58). Per instant claims 9-11, porphyrin such as copper phthalocyanine is disclosed as hole transport material (see col. 8, lines 19-28). The anode is comprised of indium tin oxide (see col. 8, line 1) and the cathode is comprised of Mg-Ag (see col. 13, lines 7-11) per instant claim 17. The cathode may further contain a layer comprising an alkaline metal per instant claim 18 (see col. 13, lines 18-20). The mixed region further comprises a luminescent dopant such as rubrene (see col. 14, lines 44-47) per instant claims 21, 22, and 46. Per instant claims 23 and 24, a phosphorescent dopant such as fac tris(2-phenylpyridine)iridium may also be used in the mixed region (see col. 19, lines 46-50). The mixed region may comprise 5 wt % to 95 wt % of the hole transport material and 5-95 wt % of the electron transport material per instant claims 25 and 27 (see col. 17, lines 49-53). The mixed region may further comprise a dopant at 0.01 wt% to 25 wt % per instant claims 26 and

28. Preferred hole transport material comprises NPB and preferred electron transport material includes Alq3 per instant claims 8 and 29 (see col. 13, lines 44-46). The thickness of the mixed region is 1 nm to about 1000 nm per instant claim 31 (see col. 12, lines 34-35). Per instant claim 36, the Aziz ('250) devices are used in various types of displays (see col. 16, lines 3-5). Examiner notes that instant claims 37 and 38 may be included with this ground of rejection, since, although in product-by-process form, they are ultimately article claims. As discussed in M.P.E.P. § 2113:

> "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)... "The Patent Office bears a lesser burden proof in making out a case of *prima facie* obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 218 USPQ 289, 292 (Fed. Cir. 1983).

Per instant claim 45, preferred electron transporting material tris(8-quinolinolato) aluminum for the mixed layer is a luminescent material (se col. 13, lines 33-55). Per instant claims 48 and 49, a protective layer may be included (see col. 13, lines 25-28) and the device is operated at 70 degrees Celsius (see col. 15, lines 3-4). Aziz ('250)

discloses all components required by instant claims 1-12, 15-18, 21-29, 31, 36-51, and 53.

6. Claims 1, 7, 8, 17-19, 21, 22, 25-29, 31-33, 37-39, 43, 45, 46 and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakaya et al. (US 5,792,557). Nakaya et al. discloses an organic electroluminescent device comprising on a substrate an anode, hole injecting and transporting layer, a light emitting layer, an electron injecting and transporting layer, and a cathode per instant claims 1 and 53 first electrode, mixed region, second electrode, hole transport region, and electron transport region (the thermal protective layer (iv) is optional) (see Figure 1 and col. 115, lines 55-64). The Nakaya light emitting layer is equivalent to the instant "mixed region". The light emitting layer is comprised of the inventive compound, which is an aromatic tertiary amine, (see formula (I)), which excels in hole injecting and transporting ability (see col. 116, lines 59-60), and a compound with an electron injecting and transporting function (see col. 121, lines 53-58 and col. 122, lines 4-11). The device further contains a hole transporting layer comprising a compound other than the inventive compound such as aromatic tertiary amines, carbazole derivatives, and polythiophenes (see col. 117, lines 5-9) per the instant claim 1 (a.) requirement that the hole transport material is dissimilar to the hole transport material in the mixed region. Per instant claims 7 and 29, the preferred electron transporting material is tris(8-quinolinolato)aluminum, which is a metal oxinoid (see col. 121, lines 62-63). Per instant claims 8 and 29, one of the inventive compound (formula 1) species disclosed is bipheynyl TPD (see compound X-1, col. 91-92). Per instant claims 17-19, a Nakaya et al. preferred anode is comprised of indium tin oxide

(ITO) (see col. 123, lines 64-66) and a preferred cathode is comprised of Li (an alkaline metal), Na (an alkaline metal), or Al and alloys containing at least one of those (see col. 123, lines 55-56). Per instant claims 21, 22, 26, 28, 33, and 46 Nakaya et al. discloses a luminescent material, preferably rubrene, is doped into the mixed light emitting layer in an amount of 0.1 to 50% by weight (see col. 121, lines 10-41). The weight ratio of the hole transporting inventive compound to the electron transporting compound in the mixed light emitting layer is 30/70 to 70/30 per instant claims 25, 27, and 32 (see col. 122, lines 15-20). The thickness of the light emitting layer is from about 5 to 1,000 nm per instant claims 31 and 32 (see col. 116, lines 31-32). Per instant claim 32, tris(8-quinolinolato)aluminum is a preferred electron injecting and transporting layer material (see col. 120, lines 49-51) and the thicknesses of the light emitting layer, hole injecting and transporting layer, and electron injecting and transporting layer are disclosed as 5 to about 1000 nm (see col. 116, lines 28-32). Examiner notes that instant claims 37 and 38 may be included with this ground of rejection, since, although in product-by-process form, they are ultimately article claims as discussed in M.P.E.P. § 2113. Per instant claims 39 and 43, Figure 1 discloses one each of a hole transporting layer, light emitting layer, and electron transporting layer. Per instant claim 45, preferred electron transporting material tris(8-quinolinolato) aluminum for the mixed layer is a luminescent material (see col. 121, lines 53-63). Nakaya et al. discloses all components and is deemed to anticipate claims 1, 7, 8, 17-19, 21, 22, 25-29, 31-33, 37-39, 43, 45, 46 and 53.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 13, 14, 19, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz et al. (US 6,392,250). Aziz is relied upon as set forth above for the rejection of claim 1. Aziz fails to teach (per instant claim 13) specifically an embodiment of the device comprising a hole transport region comprising porphyrin and another layer comprising the second hole transport material, although Aziz does teach porphyrins and multiple layered hole transport regions (see col. 8, lines 19-32 and col. 6, lines 56-58). It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a two layer hole transport region comprising porphyrin in one layer, because Aziz generally teaches two layered hole transport regions and teaches porphyrin as a hole transport material. Per instant claim 14, Aziz ('250) fails to describe specifically a mixed hole transport region comprising from 25 to 99 wt % of porphyrin. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a mixed layer comprising porphyrin at any mixture ratio, because Aziz teaches mixtures of hole transporting material (see col. 8, lines 31-32) and porphyrin as well as other hole transporting materials, which would perform the hole transporting function similarly. Per instant claim 19, Aziz discloses a layer of alkaline metal as part of the cathode (see col. 13, lines 16-21), but fails to set forth specifically

Li, Na, K, and Cs as the alkaline metals. It would have been obvious to one of ordinary skill in the art to have selected Li, Na, K or Cs, because Aziz generally teaches alkaline metals and these metals constitute the majority of alkaline metals. Per instant claim 30, Aziz fails to teach specifically the thickness of the entire device. It would have been obvious to one of ordinary skill in the art to have formed the device at a thickness within the range of about 100 nm to 5000 nm, because the total thicknesses of the individual components taught by Aziz encompasses the claimed range (see col. 8, lines 13-14; col. 9, lines 31-37; col. 10, lines 53-59; col. 12, lines 34-36; and col. 13, lines 22-24).

9. Claims 2-6, 9-16, 30, 40-42, 44, 47, and 49- 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya et al. (US 5,792,557). Nakaya et al. is relied upon as set forth above. Nakaya et al. discloses an organic electroluminescent device comprising on a substrate an anode, a hole injecting and transporting layer, a light emitting layer, an electron injecting and transporting layer, and a cathode per instant claims 1 and 53 first electrode, mixed region, second electrode, hole transport region, and electron transport region (the thermal protective layer (iv) is optional) (see Figure 1 and col. 115, lines 55-64). The Nakaya light emitting layer is equivalent to the instant "mixed region". The light emitting layer is comprised of the inventive compound, which is an aromatic tertiary amine, (see formula (I)), which excels in hole injecting and transporting ability (see col. 116, lines 59-60), and a compound with an electron injecting and transporting function (see col. 121, lines 53-58 and col. 122, lines 4-11). Nakaya et al. discloses a hole transporting material the inventive compounds (formula 1) as well as aromatic tertiary amines, hydrazone , carbazole, triazole, imidazole,

oxadiazole derivatives, and polythiophenes (see col. 117, lines 1-9 and abstract). As electron transporting material, Nakaya et al. discloses tris(8-quinolinolato) aluminum, oxadiazole derivatives, perylene quinoline derivatives, quinoxaline derivatives, diphenylquinone derivatives, and nitro-substituted fluorene derivatives (see col. 120, lines 49-59). Instant claims 2-6, 41, 42, 44, 47, 50, and 51 set forth various embodiments of the instant claim 1 device wherein the electron transporting materials of (ii) and (vi) are similar or dissimilar and wherein the hole transporting materials of (ii) and (v) are either similar or dissimilar. Although Nakaya et al. sets forth some preferred compounds for the mixed layers and transporting layers, the reference fails to discuss whether or not the materials of the electron transporting and hole transporting layers should be selected as similar or dissimilar. It would have been obvious to one of ordinary skill in the art at the time of the invention based on the teachings of Nakaya to assemble a device comprising a hole transporting layer, mixed light emitting layer comprising hole transporting material and electron transporting material, and an electron transporting layer comprising hole transporting materials that are either similar or dissimilar from one another and comprising electron transporting materials that are either similar or dissimilar from one another, because Nakaya et al. teaches several suitable hole transporting materials and electron transporting materials that would each respectively perform either hole transporting functions or electron transporting functions. The disclosed hole transporting materials are considered functionally equivalent whether similar or dissimilar and the electron transporting materials are considered functionally equivalent whether similar or dissimilar. Further per instant claims 5 and 6,

Nakaya et al. teaches either hole transport layers or electron transport layers may be omitted (see col. 116, lines 22-24). Claims 12 requires the hole transport region have two layers and claims 15 and 16 require the electron transport region have two layers. Claim 40 requires each of layers (ii)-(vi) to comprise a plurality of layers. Nakaya et al. fails to teach specifically there are two hole transporting layers, two mixed regions, or two electron transporting layers. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed two layers for each region from the same material or similar functioning material, because two layers of the same or similar material would perform the same function as a single layer of the same type of compound. Claim 30 requires the thickness of the organic light emitting device is from about 100 nanometers to about 5,000 nanometers and the thicknesses of the mixed region is from 10 nanometers to about 500 nm. Nakaya et al. teaches each of the thicknesses of the light emitting layer, hole injecting/transporting layer, and electron injecting layer are from 5 to 1000 nm (see col. 116, lines 31-32), the anode is about 10 to 500 nm thick (see col. 123, lines 66-67) and the cathode is 10 to 1000 nm thick (see col. 123, lines 57-59). Although Nakaya et al. fails to teach the total thickness of the device, based upon the taught ranges of thickness for the individual layers, it would have been obvious to one of ordinary skill in the art to have selected layers with thicknesses that total from 100 nm to 5,000 nm, because the total individual thicknesses taught by Nakaya et al. fall with the total range of instant claim 30. Nakaya et al. fails to teach the operating temperature of the device per instant claim 49; however, Nakaya et al. does teach an advantage of the inventive compounds (formula 1) is that they are

able to withstand high heat and the glass transition temperature as high as about 80 to 200 degrees Celsius (see col. 115, lines 42-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to have operated the Nakaya et al. device at a temperature range below about 80 degrees Celsius, because the temperature range is below that at which the materials in the device will start to decompose. Per instant claims 9-11, 13, and 14 Nakaya et al. recognizes porphyrins such as copper phthalocyanine used with aromatic tertiary amines as hole transporting materials known in the art, but does not discuss any embodiments using copper phthalocyanine (see col. 2, lines 4-5 and 10). It would have been obvious to one of ordinary skill in the art to have used copper phthalocyanine as hole transporting material in the Nakaya et al. devices, because Nakaya et al. teaches copper phthalocyanine is known hole transporting material and the copper phthalocyanine would perform the hole transporting function required by the hole transporting layer. Per instant claims 13 and 14, it further would have been obvious to have used the copper phthalocyanine in combination with another hole transporting material either in a single layer, in laminated layers or in mixture, because any combination of the disclosed hole transporting materials would perform the hole transporting function similar to a single layer of hole transporting material. Per instant claim 14, it would have been obvious to have used any mixture ratio of hole transporting materials, because the hole transporting materials equivalently provide the same desired function of hole transporting.

10. Claims 23, 24, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya et al. (US 5,792,557) in view of Nishi et al. (US

2002/0034659 A1). Nakaya et al. is relied upon as set forth previously for the rejection of claim 1 upon which claims 23 and 24 depend. Nakaya et al. teaches the light emitting mixed region comprises luminescent material doped at a concentration of 0.1 to 30 percent by weight and teaches it is contemplated to dope with other fluorescent and luminescent materials other than rubrene (see col. 121, lines 37-43). Claim 23 requires the instant mixed light emitting region be doped with a luminescent material that is phosphorescent. Although Nakaya et al. teaches a luminescent dopant, as just stated, it fails to teach a luminescent material that is a phosphorescent dopant. Nishi et al. teaches in analogous art a mixed region that is doped with phosphorescent PtOEP (see par. 57) (per instant claim 24). It would have been obvious to one of ordinary skill in the art to have doped the Nakaya et al. mixed region with a luminescent material such as phosphorescent PtOEP, because Nakaya et al. teach any luminescent material may be used as a dopant and Nishi et al. teach PtOEP is a known dopant for a mixed light emitting region of an organic electroluminescent device. Nakaya et al. fails to teach per instant claim 36 the electroluminescent elements are part of a display. Nishi et al. teach display devices are manufactured by using organic light emitting elements (see par. 2) It would have been obvious to one of ordinary skill in the art to have used the Nakaya et al. organic electroluminescent elements in a display, because it is very well known in the art that individual electroluminescent elements are used to form a full display as evidenced by Nishi et al.

11. Claims 20, 34, 35, 48, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya et al. (US 5,792,557) in view of Mishima (US 2001/0053462

A1). Nakaya et al. discloses all elements of the device of claim 1, as discussed and relied upon above, but fails to disclose a thermal protective layer comprised of silicon oxide or silicon dioxide. Per instant claims 20, 48, and 52, Nakaya et al. fails to teach a thermal protective layer comprised of silicon oxide or silicon dioxide on an electrode. Mishima teaches in analogous art a protective layer of silicon oxide or silicon dioxide on the outside of the cathode for protecting the organic light emitting device from substances which accelerate deterioration of the device, such as water or oxygen from entering the device (see paragraph 42, page 4). It would have been obvious for one of ordinary skill in the art to have included a protective layer over the cathode for protection, because Mishima teaches the advantages of using such a protective layer on a cathode for protecting the device against degradation. Per instant claim 34, Nakaya et al. discloses all components of the device except the thermal protective layer, part (iv). Nakaya et al. teaches the ITO anode has a thickness about 10 to 500 nm (see col. 123, lines 66-67). The Nakaya aluminum cathode has a thickness of about 10 to 1000 nm per instant claim 29, part (v) (see col. 123, lines 57-58). Nakaya et al. teaches the thicknesses of the regions are from 5 to 1000 nm thick, parts (ii), (v) and (vi) (see col. 116, lines 28-32). Nakaya et al. teaches all materials required for components (i)-(v). Furthermore, the mix ratio of inventive compound biphenyl TPD (compound x-1) to tris(8-quinolinolato) aluminum is from about 30/70 to 70/30 per instant claim 34, part (ii) (see col. 122, lines 12-19). As stated previously, Nakaya et al. fails to teach a thermal protective layer comprised of SiO or silicon dioxide per instant claim 34. Mishima teaches in analogous art a protective layer of silicon oxide or silicon dioxide on

the outside of the cathode for protecting the organic light emitting device from substances which accelerate deterioration of the device, such as water or oxygen from entering the device (see paragraph 42, page 4). It would have been obvious for one of ordinary skill in the art to have included a protective layer over the cathode for protection, because Mishima teaches the advantages of using such a protective layer on a cathode for protecting the device against degradation. Mishima does not teach the thickness of the protective layer per instant claims 34; however, it would have been obvious to have formed the protective layer in the range of 5 to 1000 nm, since Nakaya et al. teaches this range of thicknesses as suitable for layers in an organic light-emitting device. Per instant claim 35, Nakaya et al. discloses doping the mixed light emitting region with rubrene at a concentration of 0.1-20 percent by weight (see col. 121, lines 3-41). As stated previously, Nakaya et al. teaches the metal oxinoid tris(8-quinolinolato) aluminum as preferred electron transporting material (see col. 120, lines 49-51).

Double Patenting

12. Claims 1, 7, 8, and 53 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 42 of copending Application No. 10/005,993. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims generally set forth the same materials as '993. For instance, the material "biphenyl TPD" recited by '993 in the mixed region is a hole transporting compound as required by the instant application. Biphenyl TPD is set forth in dependent claim 8.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

13. Claims 1, 9, and 53 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of copending Application No. 10/005,970. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims generally set forth the same materials as '970; for instance, '970 recites a hole transporting layer comprising porphyrin in combination with another hole transport material, which are both hole transporting compounds per the instant application. The instant application claims porphyrin in dependent claim 9.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

14. Claims 1-12, 15-17, 21-29, 36, 39-47, 50, 51, and 53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5-16, 22-25, 27-34, 38-40, and 43-48 of U.S. Patent No. 6,392,250. Although the conflicting claims are not identical, they are not patentably distinct from each other because the thermal layer in the instant claims is optional and the hole transport material and electron transport material in the patent can also be similar or dissimilar materials.

15. Claims 17, 12, 15, 16, 25, 27, 36, 39-47, 50, 51, and 53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12, 17-19, and 24-35 of U.S. Patent No. 6,392,339. Although the

conflicting claims are not identical, they are not patentably distinct from each other because the thermal layer in the instant claims is optional and the hole transport material and electron transport material in the patent can also be similar or dissimilar materials.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703) 305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.

Dawn L Garrett

DAWN GARRETT
PATENT EXAMINER
TECHNOLOGY CENTER 1700

D.G.
June 11, 2003